

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.0 INTRODUCTION

This Chapter describes the alternatives developed to address the relevant issues, presents a comparison of the alternative features and a summary of the effects that would result from implementing each alternative. Section 2.2 contains a detailed description of the alternatives.

2.1 DEVELOPMENT OF ALTERNATIVES

Alternatives present different management options to address the relevant major issues related to the proposed action. The impact analysis in Chapter 4 describes the known or potential effects that would result from implementing each alternative.

Alternative A is the No Action Alternative. In this alternative no approval would be issued for the POD. The existing situation would continue and no private or federal wells or associated infrastructure would be constructed or tested. This alternative was included to provide the required basis for comparison with the action Alternatives B and C.

Alternative B is the No Federal Action Alternative. Only the private wells and associated infrastructure would be constructed. The BLM would not approve the federal wells and associated infrastructure. This alternative limits CBNG exploration to private lands and minerals only in order to reduce the overall potential impacts to water resources, wildlife, and cultural resources. This alternative complies with the Montana Board of Oil and Gas Conservation Order No. 99-99.

Alternative C is the Proposed Action with Additional Mitigation. PRG's proposed exploration POD would be approved, including drilling and testing of the private and federal wells and construction of the associated infrastructure. Mitigating measures not already part of the operator's proposal have been included as part of this alternative. This alternative was developed to analyze full implementation of PRG's proposal, while incorporating mitigating measures identified during project review that would avoid or reduce impacts to area cultural and natural resources. Alternative C is the agencies' preferred alternative.

2.1.1 Alternatives considered but eliminated from Detailed Analysis

Injection of Produced Water

This alternative was suggested as a means to reduce the amount of water requiring treatment or surface disposal. Due to the limited amount of water that would be produced during testing, reinjection of the produced water would not offer sufficient environmental advantages and was not considered in detail. Furthermore, because one purpose of the proposed action is to demonstrate the feasibility of the Higgins Loop water treatment system, the water will be treated and mixed to be suitable for discharge. Reinjection of treated water is not necessary.

Treatment of All Produced Water Before Discharge

The alternative to require complete treatment of all produced water was considered but not analyzed in detail due to the limited amount of water that would be produced during the length of the exploration testing. The quality of the proposed mixture of treated and untreated water to be discharged under the MPDES permit would be protective of beneficial uses and meet water quality standards.

2.2 DESCRIPTION OF THE ALTERNATIVES

A comparison of the major components for the three alternatives is found in Table 2.5-1. A detailed description of each alternative follows.

2.2.1 Alternative A—No Action

The agencies would not approve any actions for the drilling or testing of either the private or federal wells. None of the associated infrastructure would be approved. The entire PRG Coal Creek Exploration POD would be denied. The two existing private wells would remain shut in.

2.2.2 Alternative B—No Federal Action

The MBOGC would approve the drilling and testing of eight private wells and associated infrastructure. The MDEQ would approve the treatment plant and discharge of treated water from the wells into the Tongue River. The eight wells would be drilled to test the Flowers-Goodale and Wall coal zones at four well sites. Appendix A provides the legal location of the well sites. Two previously drilled private wells would also be tested for CBNG potential. The BLM would not approve any of the federal wells and associated infrastructure.

Well Locations and Support Facilities

Map 1.3-2 shows the project boundary, existing and proposed well locations, access roads, pipelines for water and potential gas, existing overhead power line, buried power lines, a central gathering/metering/water processing facility with water storage pit (loop facility), and a water discharge point in the POD area.

All of the wells and associated infrastructure would be located on private surface. The road and pipeline routes are proposed as agreed to by the appropriate private surface owner. Where possible, whether proposed two-track road or existing, the roads would serve as a common corridor for the gas, electric or water lines. To minimize future surface disturbance, the gas lines would be installed during the trenching operations for the power and water lines; although they would not be utilized until production has been approved in a future analysis.

Well Pad Construction and Drilling

Construction of a well pad would not be necessary at any of the four well sites; however, approximately 1-acre would be disturbed at each well site from vehicles, equipment storage, and pit construction. At each well location a 25 feet wide x 40 feet long x 4 feet deep reserve pit would be constructed for the disposal of drill cuttings and fluids. The reserve pits would be fenced on three sides during drilling and on the fourth side after the drilling rig has moved off of the location. Pit closure and reclamation would occur after evaporation of the fluids.

Well Testing

CBNG potential would be determined at the eight proposed private wells and two existing private wells by pumping groundwater from the coal seams; thereby reducing hydrostatic pressure and allowing any methane to desorb from the coal surface and flow toward the wells. Produced gas would be measured at the well location. After measurement, the gas would be vented at the wellhead into the atmosphere approximately 10 feet above ground level. In areas where there is a safety concern or a possible ignition source within 1000 feet, the gas would be flared. Flaring would be performed utilizing all current industry practices to ensure safety. Testing would not exceed six (6) months per well or 1260 MCF of produced gas per well, whichever occurs first. After testing, the well would be secured and shut in, groundwater pumping would cease, and gas pressures would be monitored.

Produced Water Management and Treatment

Water produced from the CBNG wells would be treated at a loop facility prior to discharging it directly into the Tongue River at one discharge point. The Higgins Loop treatment facility would cover an area 200 feet wide x 200 feet long. Produced water from the CBNG wells would enter one of two pit chambers. Each of the two pit chambers would measure 125 feet long, 62.5 feet wide, 10 feet deep, containing approximately 0.6 acre-feet per chamber. The entire pit area would be lined with a 20 mil polyethylene liner to insure no transmission of produced water to ground water occurs. The pits would be constructed with an approximate 50 feet deep monitoring well located down gradient of the pit in a permeable layer capable of holding water. The well would be instrumented with a piezometer to detect if any produced water leaks from the pits. The pit has a design capacity of 420,000 gallons of water, leaving a 2-foot freeboard. Operations volume would be about 210,000 gallons. Water flow through the pit will be approximately 200 gpm; therefore pit volume would be exchanged at least twice per day.

Once the water has settled in the first chamber, it would then enter the Higgins Loop for treatment. The primary objective in treating CBNG produced water is removal of sodium ions (Na^+) in order to reduce SAR levels. In addition, some situations may require the removal of barium and other heavier cations in order to meet MPDES discharge requirements. A strong acid cation exchange resin is used to scavenge the cations from the water as it is passed through the Higgins Loop. The cations are replaced by hydronium ions from resin beads. The hydronium ions are released in the treated water, which lowers the pH of the water. This allows the bicarbonate ions in the water to react with the hydronium ions to form carbon dioxide gas. The treated water is then discharged to a neutralizing bed where excess hydronium ions and residual bicarbonate ions can react with selected calcite to

achieve the desired pH. Neutralizing agents other than calcite (lime or limestone) may be used should the need arise.

Concurrent with the sodium and other cation loading that is taking place in the absorber section of the Loop; cations are stripped from the resin in the regeneration section. Dilute hydrochloric acid is injected into the loop and moves counter-current to the resin to the spent brine discharge, leaving the resin restored to the hydronium form.

The treated water would be mixed with untreated water to the degree allowable without causing the EC to exceed 1,000 $\mu\text{S}/\text{cm}$ or the SAR to exceed 3 during the irrigation season. Based upon the treated and untreated water quality data contained in the POD book for this project, this mixing would cause the SAR standard of 3 to be met first, at which time the EC would be 742 $\mu\text{S}/\text{cm}$. This discharge would be 71% treated and 29% untreated. The mixed effluent would then be discharged into the Tongue River at a rate not to exceed the permitted 450 gpm. Actual discharge under this alternative would be anticipated to be 250 gpm (10 wells at a rate of 25 gpm).

Following the Higgins Loop processing, the treated water would enter the remaining pit chamber prior to discharge into the Tongue River. Primarily, the treated water would be discharged into the Tongue River; however the operator has proposed a variety of potential uses for a minimal portion of the treated water including, dust abatement, drilling activities, construction activities and vehicle wash-downs. Individual landowners could also file for beneficial use of the treated water for livestock or irrigation.

The Higgins Loop facility would utilize remote sensing telemetry equipment to meter gas/water production and to monitor the treatment process. In the event of an emergency, the 1.2 acre-feet capacity pit chambers would be utilized for produced water containment until the wells were shut down. The treatment facility would be entirely fenced to exclude the public and wildlife. The acid and waste stream would be contained in tanks surrounded by spill containment berms.

Concentrated waste brine volumes average approximately one percent of the total Loop feed volume, depending on the cation loading that is removed from the treated water. The waste stream from the treatment process, at maximum flow, would generate approximately 86 barrels of brine or reject water per day. Prior to disposal, PRG intends to treat the waste brine onsite, by passing it through a limestone bed to raise the pH above a 2. Waste brine would be transported offsite by truck for disposal injection into a Class 1 disposal well, located in Wyoming. Waste brine would be hauled in accordance with all DOT and EPA requirements. Precautionary measures would be taken to ensure safe transport of brine from the facility to the disposal well. Especially when transporting adjacent to water bodies of the State. During periods of adverse weather and driving conditions, transportation efforts may be suspended until more favorable conditions exist. In the event of an accidental spill, all pertinent governing agencies would be immediately notified. Waste brine would be hauled to any one of the following three wells, which are owned and operated by Kissack Water and Oil Service.

- Kissack WDW 31-25; Permit #01-109, Sec. 25, T. 51 N., R. 70 W.
- Hamm #1 Injection Well; Permit #01-036, Sec. 17, T. 50 N., R. 69 W.
- Horse Creek Injection Well; Permit #01-337, Sec. 8, T. 47 N., R. 68 W.

No production facility, compressor engines or other infrastructure for the production of CBNG are proposed. After testing is complete, the wells would either be shut-in or plugged in accordance with state regulations.

Reclamation Plan

Reclamation of the drill sites would be in accordance with agreements between PRG and the landowners. Reclamation of the surface would include the closure of the reserve pits and seeding of disturbed areas. Reclamation, plugging and abandonment would occur on those wells determined to be a dry hole. Interim reclamation to stabilize the well site would occur for those wells with potential commercial quantities of CBNG. These wells would be shut in until a commercial sales pipeline is available for transport out of the project area. PRG would be required to submit documentation and obtain the proper agency authorizations before this production could take place.

Completion of reclamation would occur within one year of the construction depending on weather conditions. The disturbed areas would be disked and seeded with a weed-seed free mix approved by the Natural Resource

Conservation Service and the surface owner. At a minimum, 12 pounds per acre of seed would be planted, with the initial reseeding in the fall of 2005.

Following the use of the treatment facility the equipment would be removed from the site. The pit chambers would be reclaimed by first removing all the water through evaporation. Sediments, if any in the bottom would be sampled and tested for hazardous characteristics. If deemed hazardous, they would be removed and disposed of at a licensed disposal facility in a manner consistent with their classification. If not hazardous, the sediments and the pond liner would then be cut and folded in on itself and buried in place. The pit would be recontoured to original topography, top soil would be placed over the surface and the area reseeded.

For a detailed description of design features, construction practices, water management strategies, and reclamation associated with the no federal action alternative, refer to the Master Surface Use Plan, Drilling Plan and Water Management Plan in the POD and individual APDs. More information on CBNG well drilling, production and standard practices is also available in the MT FEIS.

2.2.3 Alternative C—Proposed Action, with Additional Mitigation (*Preferred Alternative*)

The MBOGC would approve the drilling and testing of eight private wells and associated infrastructure. The BLM would approve the drilling and testing of eight federal wells and associated infrastructure. The MDEQ would approve the treatment plant and discharge of treated water from the wells into the Tongue River. The 16 wells would be drilled to test the Flowers-Goodale and Wall coal zones at eight well sites. Appendix A provides the legal location of the well sites. Two previously drilled private wells would also be tested for CBNG potential.

Well Locations and Support Facilities

Map 1.3-2 shows the project boundary, existing and proposed well locations, access roads, pipelines for water and potential gas, existing overhead power line, buried power lines, a central gathering/metering/water processing facility with water storage pit (loop facility), and a water discharge point in the POD area.

All of the wells and associated infrastructure would be located on private surface. The road and pipeline routes are proposed as agreed to by the appropriate private surface owner. Where possible, whether proposed two-track road or existing, the roads would serve as a common corridor for the gas, electric or water lines. To minimize future surface disturbance, the gas lines would be installed during the trenching operations for the power and water lines; although they would not be utilized until production has been approved in a future analysis.

Well Pad Construction and Drilling

Construction of a well pad would not be necessary at 7 of the 8 well sites; however, approximately 1 acre would be disturbed at each well site from vehicles, equipment storage, and pit construction. Construction of a well pad would be needed at the 11-6 well site. At each well location a 25 feet wide x 40 feet long x 4 feet deep reserve pit would be constructed for the disposal of drill cuttings and fluids. The reserve pits would be fenced on three sides during drilling and on the fourth side after the drilling rig has moved off of the location. Pit closure and reclamation would occur after evaporation of the fluids.

CBNG potential would be determined at the 16 proposed private wells and two existing private wells in the same manner as described above in Alternative B. Testing would not exceed six (6) months per well or 1260 MCF of produced gas per well, whichever occurs first. After testing, the well would be secured and shut in, groundwater pumping would cease, and gas pressures would be monitored.

Produced Water Management and Treatment

Water produced from the CBNG wells would be treated at a loop facility prior to discharging it directly into the Tongue River at one discharge point. Construction and operation of the Higgins Loop treatment facility would be the same as described above in Alternative B, but would treat water from all the private and federal wells.

The treated water would be mixed with untreated water to the degree allowable without causing the EC to exceed 1,000 $\mu\text{S}/\text{cm}$ or the SAR to exceed 3 during the irrigation season. Based upon the treated and untreated water quality data contained in the POD book for this project, this mixing would cause the SAR standard of 3 to be met first, at which time the EC would be 742 $\mu\text{S}/\text{cm}$. This discharge would be 71% treated and 29% untreated. The

mixed effluent would then be discharged into the Tongue River at a rate not to exceed the permitted 450 gpm. Actual discharge under this alternative would be anticipated to be 450 gpm (18 wells at a rate of 25 gpm).

Waste brine generated by the treatment process would be transported by truck to the same three Wyoming disposal wells cited in Alternative B for disposal. The waste stream from the treatment process, at maximum flow, would generate approximately 154 barrels of brine or reject water per day.

No production facilities, compressor engines or other infrastructure for the production of CBNG is proposed. After testing is complete, the wells would either be shut-in or plugged in accordance with state or federal regulations.

Reclamation Plan

Reclamation of the drill sites would be in accordance with agreements between PRG and the landowners. Reclamation of the drill sites and water treatment facility would be conducted in the same manner as described in Alternative B. The disturbed areas would be recontoured, disked and seeded by the fall of 2005.

A detailed description of design features, construction practices, water management strategies, and reclamation measures proposed by PRG can be found in the Master Surface Use Plan, Drilling Plan and Water Management Plan in the POD and individual APDs on file with the BLM in Miles City. More information on CBNG well drilling, production and standard practices is also available in the MT FEIS.

Additional Mitigating Measures

The following additional mitigating measures are part of Alternative C and would be required as conditions of approval if this alternative were selected.

1. The operator shall notify BLM (406-232-7001) at least 48 hours before beginning construction activities associated with the sites listed below. BLM shall immediately notify the Northern Cheyenne Tribe about construction activities. The operator shall provide the opportunity to the Northern Cheyenne Tribe for a qualified cultural resources specialist to monitor construction in the locations listed below for the Federal portion of the Powder River Gas Coal Creek Coal Bed Natural Gas Plan of Development (POD) Area. If a Northern Cheyenne Tribal Representative is not available, the company shall use its consulting archaeologist or an archaeologist holding a valid BLM Cultural Resources Permit. The results of monitoring shall be reported in writing by the Tribe or Consulting Archaeologist to BLM within 14 days after completion of monitoring activities.

The purpose of the monitoring is to identify any cultural resources that may be discovered by construction activities. The cultural resources specialist may temporarily halt construction within 300 feet (100 meters) of the find until it can be evaluated by a BLM Cultural Resources Specialist. The operator shall immediately notify BLM (406-232-7001) upon either the discovery of cultural resources or the impact to cultural resources. The BLM authorized officer shall respond to the operator within the five working days as per Condition of Approval No. 5. The same conditions in Conditions of Approval No. 4 and No. 5 would apply for buried cultural resources encountered during monitoring.

MONITORING REQUIREMENTS:

Well 11-6: Monitor construction of Well Pad and proposed flowline and underground power to the Tongue River Road.

Well 15-6: Monitor trenching operations for powerline and flowline to Tongue River Road and excavation of reserve pit.

Well 13-6: Monitor excavation of reserve pit and trench for power and flowline to the 3-7 well.

Well 5-6: Monitor excavation of the reserve pit and any road blading from the proposed gate to the well pad.

Paradox Loop Facility: Monitor construction of facility pad, and pits, and road/infrastructure corridor

trench from the Tongue River Road to the to the facility pad. The proposed trench for the buried waterline from the facility to the proposed outfall along the Tongue River also shall be monitored.

Tongue River Road Corridor. Monitor trenching operations from the where the proposed infrastructure corridor meets the road at the 15-6 road to the proposed corridor for the Paradox Loop Facility.

2. The operator shall not discharge any produced water from Federal wells, into the Tongue River, until the MDEQ MPDES Permit has become “Effective”.
3. The operator shall not discharge any produced water from Federal wells, into the treatment facility holding pond, unless an effective MBOGC Permit to Construct or Operate an Earthen Pit or Pond is in place.
4. The operator must obtain all required permits for the treatment facility, waste transport and disposal before any water production from Federal wells can occur.
5. The Operator must install 1 monitoring well within 50 feet of the treatment facility impoundment. This well will be located underneath and down gradient of the impoundment. The well will be instrumented with a piezometer to detect the presence of water under the impoundment. This is to monitor the effectiveness of the polyethylene lining. This impoundment has an impermeable 20 mil medium density polyethylene liner, therefore deeper monitoring is not needed. It is not anticipated that this well will contain any water initially. This well will be gauged monthly and reported to the BLM authorized officer monthly unless water levels change by 1 foot or more, or if water is detected in a previously dry well. Also, water sampling will occur quarterly; and samples will be analyzed for major ions (Ca, Mg, Na, K, SO₄, Cl, and HCO₃). If changes are observed, the BLM authorized officer must be notified within 5 business days and a cause analysis conducted. If adverse monitoring results are recorded, discharge into the impoundment may need to be stopped, the water removed and repairs conducted, prior to the reintroduction of produced water to the impoundment. Monitoring of the well will continue for the life of the impoundment and/or groundwater quality returns to background levels.
6. If any sediments form in the treatment facility pond they will be: a) sampled and tested for toxic characteristics, and b) removed by scarifying the liner and disposing of them as indicated by the results of the toxic characterization tests.
7. For all Federal wells, the operator shall report the gas produced, water produced and wellhead pressure during the well testing phase. The gas shall be estimated by orifice well tester or measured by orifice meter. The estimated or measured volumes and pressures will be provided to the BLM, Miles City Field Office on a monthly basis (for the Federal wells).
8. The operator shall submit an interim or final reclamation plan, including a facility management plan, to the Authorized Officer, within 30 days following the conclusion of testing operations. The reclamation plan must include all surface owner requirements regarding reclamation.
9. The operator is responsible for complying with all applicable local, state and federal laws and regulations, and for obtaining all required authorizations and permits.
10. The operator shall monitor specific wildlife species as required:
 - Raptor nest productivity (including bald eagle)
 - Bald eagle winter roosts

2.3 CUMULATIVE ACTIONS

The MT FEIS analyzed long-term cumulative effects of CBNG activity throughout the region and disclosed the general types of effects to be considered in more detail during the review of site-specific CBNG proposals such as the PRG exploration POD. Cumulative effects are the result of impacts from other past, present, or reasonably foreseeable future actions that would overlap in time and locale with the direct effects of the proposed action or

alternatives, thus resulting in “cumulative effects” distinctly different (greater or less) than the direct effects. Due to the small number of wells involved in the project, the limited duration of the well testing activity, and the location of the PRG project at least five miles from other area activities, there is little potential for the PRG project or alternatives to result in cumulative effects. The actions listed below have been considered as potential contributors to cumulative effects. A specific cumulative effects analysis for each resource is presented in Chapter 4 by alternative.

2.3.1 Past Actions

Decker Coal Mine

The Decker Mine is a surface coal mine operated by Decker Coal Company, a Kiewit subsidiary. The East Decker Mine is located approximately five miles southwest of the PRG project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 11,400 surface acres. The average annual coal production is 10 million short tons. The scope and nature of the Decker Coal Mine, as well as its proximity to the PRG project creates only a minor potential for cumulative effects.

Spring Creek Coal Mine

The Spring Creek Mine is a surface coal mine owned and operated by Spring Creek Coal Company. The mine is located approximately five miles west-southwest of the PRG project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 7,000 surface acres. The average annual coal production is 11 million short tons. The scope and nature of the Spring Creek Coal Mine, as well as its proximity to the PRG project creates only a minor potential for cumulative effects.

Absaloka Coal Mine

The Absaloka Mine is a surface coal mine located adjacent to the Crow Reservation, owned and operated by Westmoreland Resources. The mine is located approximately thirty five miles northwest of the PRG project area. The mining method consists of open pit strip mining of Crow Tribe mineral resources. The distance of the Absaloka Coal Mine from the PRG project area makes it unlikely that there would be any cumulative effects to project area resources.

Conventional Oil and Gas Development

A total of 1,991 conventional oil and gas wells have been drilled in Big Horn and Rosebud counties, approximately 22% are federal or Indian wells. The conventional oil and gas wells within approximately 20 miles of the PRG project area have been abandoned. Cumulative impacts from conventional oil and gas development are not likely.

2.3.2 Present Actions

CBNG Development

According to the Montana Board of Oil and Gas Conservation website, June 29, 2004, approximately 495 CBNG wells have been drilled in Big Horn County; approximately 98 wells or less than 20% are Federal wells. Status of these wells includes drilling, shut-in, producing and plugged. Currently 456 CBNG wells, all in Big Horn County, are considered to be in production. This development is found in the CX Field, near Decker, Montana.

The CX Field, including Badger Hills Project area, is a CBNG producing field operated by Fidelity Exploration & Production Company. The field encompasses approximately 56 sections between the Montana/Wyoming state line and the Decker and Spring Creek coal mines. As of November 18, 2004, MBOGC website demonstrates the CX Field has 456 producing wells, 3 being drilled and 16 shut in. The existing CBNG producing wells are located approximately 7 miles south of the PRG project area. The CBNG wells in the CX Field are finished in the Dietz 1, Dietz 2, Dietz 3, Monarch and Carney coal seams, different coal seams than those proposed for testing by the PRG project. The scope and nature of the CX Field, as well as its distance from the PRG project creates little potential for cumulative effects to resources in the PRG project area. Discharge of produced water from the CX Field to the Tongue River is accounted for in the surface water impact assessment prepared for the PRG project.

Gravel/Scoria Pits

Some gravel or scoria would be used to surface project area roads and would come from already permitted mineral material sites. Surface disturbance associated with gravel or scoria mining would not exceed existing permit limits. The potential for cumulative or connected impacts from mineral material excavation is minimal.

Wyoming CBNG

According to the Wyoming Board of Oil and Gas Conservation website, June 29, 2004, 18,910 CBNG wells have been drilled in the state. These wells range in status from spudded, producing through abandonment. Generally, the State of Wyoming CBNG development has occurred since the early 1990's, most located in the Powder River Basin of north central/eastern Wyoming. The CBNG development is primarily located between the cities of Gillette and Sheridan.

Specifically, according to the WBOGC from 2002 to 2004, the Upper Tongue River Basin has been predicted to cumulatively have 1,474 wells drilled and 48,241 acre feet of produced water (2002, 2003 and 2004, January to May, is actual data and 2004 from May on, is predicted). The cumulative water production is only 42.8% of the predicted amount (actual 20,626 acre feet compared to predicted 48,241 acres feet).

The Buffalo Field Office, Bureau of Land Management has received six CBNG POD's. The Lower Prairie Dog and Tongue River POD have been approved and are in various stages of completion/production. The others are currently being processed. These include the following:

Table 2.3-1 – Recent Wyoming BLM PODs

POD Name	Operator	T N / R W	CBNG Wells	Water Management Plan
Lower Prairie Dog	J.M. Huber	57 / 83	23 Approved	Containment and LAD
Tongue River	Fidelity	58 / 83	23 Approved	Containment and LAD
Little Badger	J.M. Huber	58 / 82	30 Pending	Containment, LAD and Injection
Brinkerhoff	Pennaco	57 / 82 57 / 83	27 Pending	Containment and LAD
Antelope Draw	Nance Petroleum	58 / 79	31 Pending	Containment
West Antelope Draw	Nance Petroleum	58 / 80	21 Pending	Containment

The scope and nature of the Wyoming CBNG development, as well as its distance from the PRG project, would not likely create cumulative impacts to resources in the PRG project area. No cumulative impact to water quality is likely because no discharge of produced water is occurring to the Tongue River in Wyoming.

2.3.3 Reasonably Foreseeable Future Actions

The MT FEIS, which amended the Billings and Powder River RMPs for BLM, contains Reasonably Foreseeable Development and Reasonable Foreseeable Future Actions scenarios. The scenarios estimated that approximately 26,000 CBNG wells would be drilled during the 20 year life span of the plan throughout the state (page MIN-29). Two private CBNG wells have been drilled in the proposed project area. The 16 proposed wells analyzed in this document are part of the 26,000 wells predicted in the MT FEIS.

A total of 844 conventional oil and gas wells have been drilled in Big Horn County. Approximately 28% are federal or Indian wells. The MT FEIS predicts that an additional 200 conventional oil and gas wells would be drilled in Big Horn County in the next 20 years.

Even if all 18 of the proposed wells analyzed in this EA were eventually placed into production, it would represent only four percent of the estimated 456 CBNG production wells in Big Horn County.

Table 2.3-2 – Future CBNG Drilling Rate

<u>RFD/RFFA area</u>	<u>Number of wells predicted in the next 20 years</u>	<u>Number of wells drilled to date *</u>
Statewide	26,000 wells	509
County (BH, RB) area**	3,500-9,800 wells	495

*Numbers produced from the Montana Board of Oil and Gas Conservation website, June 29, 2004

**BH = Big Horn, RB = Rosebud

The 16 proposed PRG project wells are counted as part of the 3,500 - 9,800 wells predicted in the MT FEIS. All 16 wells would be located in Big Horn County. Plugged and abandoned wells, and subsequent reclamation of sites, are reasonably foreseeable. The ratio of future well abandonment to future drilling was predicted in the MT FEIS (page MIN-29). It is predicted that of the 26,000 wells drilled, approximately 2,600 wells would be dry holes in the next 20 years (10%). Therefore, consistent with that ratio, 1 - 2 wells in the PRG project could be a dry hole.

Powder River Gas (Coal Creek Production)

The current POD proposal before the agencies is for exploration drilling and testing at eight locations. While, the exploration drilling and testing results *may* be of such character that the operator decides to propose commercial production from these wells, and/or drilling of additional wells; it is not at all certain or automatic that would be the case. Production from these wells is *not* part of the proposed action or alternatives; however the exploratory locations were designed to be utilized if production is proposed in the future. Commercial production is the objective of the operator, but it is not proposed at this time (and may never be proposed). Nor could such production proceed without the operator submitting a proposed POD for production to the agencies for review and environmental analysis under NEPA and MEPA. Upon submittal of a POD for production, the agencies would review the POD and prepare another environmental analysis prior to determining whether to approve, approve with conditions, or deny the CBNG production

In order to anticipate the potential issues and impacts that could be associated with production from the exploration locations, the following hypothetical development scenario is estimated for the PRG project area. CBNG production utilizing the exploration wells, treatment facility, and with additional wells and infrastructure could be proposed. An additional 14 well locations with 28 wells could be developed based on the 80-acre spacing. Produced gas could be marketed to a gas utility company's pipeline system. These production-related activities are speculative, and are not part of the direct effects but have been considered when assessing the potential for cumulative impacts.

CX Field (Dry Creek POD)

Fidelity has submitted a proposal for the drilling and producing of an additional 38 CBNG wells, along with constructing and installing the associated infrastructure in an area of the CX Field and reclaiming disturbed areas. The project area is within the CX field, immediately west of existing production. The federal proposal is for drilling 24 federal wells on eleven sites and completing one previously drilled federal well. Eleven wells have been drilled on State minerals and three wells have been drilled on private minerals within the project area. These CBNG wells would be completed in the Dietz 1, Dietz 2, Dietz 3, Monarch and Carney coal seams. The scope and nature of the Dry Creek POD, as well as its proposed location some seven miles from the PRG project has little potential to cause cumulative effects to resources in the PRG project area. Discharge of produced water from the CX Field to the Tongue River is accounted for in the surface water impact assessment prepared for the PRG project.

CX Field (Fidelity - Coal Creek POD)

Fidelity has submitted a proposal to MBOGC and the BLM to drill and produce an additional 210 CBNG wells, and construct and install the associated infrastructure in the Coal Creek area of the CX Field. The proposed project area is immediately east of existing Badger Hills production in the field. Fidelity proposes drilling 132 federal wells, 16 state wells and 62 private wells on 47 well sites, with 1 to 5 wells drilled on each site. These CBNG wells would be completed in the Dietz 1, Dietz 2, Dietz 3, Monarch and Carney coal seams. The scope and nature of the CX Field (Coal Creek POD), as well as its proposed location some seven miles from the PRG POD has little potential to cause cumulative effects to resources in the PRG project area. Discharge of produced water from the CX Field to the Tongue River is accounted for in the surface water impact assessment prepared for the PRG project.

CX Field (Pond Creek POD)

Fidelity has disclosed an upcoming POD submittal called the Pond Creek Project Plan of Development. Although the details of the project are unknown, the general proposal is the drilling and producing of additional CBNG wells, and the constructing and installing of the associated infrastructure in an area of the CX Field. The tentative project area is immediately north and west of existing production in the CX field. Due to the distance of this project from the PRG project area, and the probable timing of activity, it does not appear likely that the Pond Creek POD would create cumulative effects to resources in the PRG project area.

CX Field (Deer Creek POD)

Fidelity has disclosed an upcoming POD submittal called the Deer Creek Project Plan of Development. Although the details of the project are unknown, the general proposal is the drilling and producing of additional CBNG wells, and the constructing and installing of the associated infrastructure in an area of the CX Field. The tentative project area is immediately north and east of existing production in the CX field. Due to the distance of this project from the PRG project area, and the probable timing of activity, it does not appear likely that the Pond Creek POD would create cumulative effects to resources in the PRG project area.

Yates Petroleum (Exploration Project)

Yates Petroleum has submitted applications to BLM for the drilling and testing of 14 wildcat CBNG wells scattered across an area from 10 miles west and 6 miles north of the Powder River Gas POD area. The proposal shows 1 well would be drilled at each well site, with 640 acre spacing. Due to the scope and nature of the Yates exploration project, as well as its distance from the PRG project area, no cumulative effects are likely to occur.

Wolf Mountain Coal, Inc.

Wolf Mountain Coal, Inc. proposes to build a coal processing plant on private land for retail sales of coal in Lot 1, Section 18, T. 8 S., R. 40 E. BLM recently issued them a right-of-way (MTM93074) for a power line across Federal surface in the NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 13, T. 8 S., R. 39 E., to provide power to the proposed site. Due to the distance of the Wolf Mountain plant from the PRG project, and the probable timing of the exploration activity, it does not appear likely that the processing plant would create cumulative effects to resources in the PRG project area.

Tongue River Railroad

The Surface Transportation Board has published a Draft Supplemental Environmental Impact Statement for the Tongue River Railroad Company's (TRRC) proposed rail line construction in Rosebud and Big Horn Counties, Montana. The document analyzes the proposed 17.3 mile "Western Alignment" route, which had been preceded by two related applications that were considered and approved by the Board in 1986 and 1996, respectively. The proposed Western Alignment is an alternative route for the southernmost portion of the 41-mile Ashland to Decker alignment; known as the Four Mile Creek Alternative. The proposed Western Alignment bypasses the Four Mile Creek alignment, which is generally located from the Birney Road (Hwy 566) and the Tongue River Canyon junction, running west to Hwy 314, then south to the Decker Mine. The Western Alignment would continue south along the Tongue River on the ridge, but paralleling the river and ending around the Spring Creek Mine area. If ever approved, this proposed route could intersect the PRG-Coal Creek project area, by crossing through Section 6, north and west of two federal well sites. Although the PRG project is near or adjacent to the proposed TRRC Four Mile Creek and Western Alignment routes, the two projects would not be constructed or operated simultaneously. The PRG exploration project would be completed within 6 months after project approval, which would be in advance of a final decision regarding the proposed Western Alignment route and any construction associated with TRR. Because impacts from the two actions would not occur in the same area at the same time, no cumulative impacts are anticipated to occur from the TRR and the PRG POD.

2.4 ASSUMPTIONS FOR THE ANALYSIS

Certain assumptions are used for impact analysis purposes. The assumptions are based upon information in the proposed action, the MT FEIS, historical data and professional experience. Assumptions used in the analysis of the alternatives include:

Access

Two Track Trails:	12 feet wide
Bladed Route:	12 feet wide
All Weather Road:	12 feet wide travel surface, 25 feet wide crown and ditched

Well Sites

Drilling:	1 acre disturbed
Production:	¼ acre disturbed, remaining disturbance reclaimed
Wells:	2 wells per site with 80 acre well density

Flowlines/Power Lines

Low pressure gas:	15 feet wide disturbed
Water:	15 feet wide disturbed
Buried power:	15 feet wide disturbed

2.5 COMPARISON OF ALTERNATIVES

Table 2.5-1 compares the main components of the three alternatives. Table 2.5-2 compares the effects identified in Chapter 4 from each of the alternatives.

This page left intentional blank.

Table 2.5-1. Powder River Gas Coal Creek Project--Comparison of Alternatives

Project Component	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
Number and type of wells and drill sites	0 Federal wells 0 Private wells 2 existing private wells at 1 well site	0 Federal wells 2 Private wells (existing)/1 well site 8 Private wells (proposed)/4 well sites	8 Federal wells/4 well sites 2 Private wells (existing)/1 well site 8 Private wells (proposed)/4 well sites
Drill site construction	No drill site construction	No drill site construction required. Temporary disturbance at 4 well sites of 1 acre	1 drill site constructed Temporary disturbance at 7 well sites of 1 acre each
Drilling Operations	No drilling operations	8 wells would be drilled with portable, truck mounted, water well drilling rigs to depths of approximately 250 feet to 1,500 feet. Air and fresh water (including coal seam water) would be used in drilling, supplemented as needed by bentonite and sawdust or wood chips. Steel casing would be cemented in place from ground surface to the top of the target coal seam.	16 wells would be drilled in the same manner as described in Alternative B
Disposal of drilling and water treatment wastes	No waste would be generated	A 25 feet x 40 feet reserve pit for the disposal of drill cuttings, water, drilling mud and excess cement is constructed at each well site. The reserve pits would be fenced. Reserve pit closure occurs within 90 days of well completion. After evaporation of fluids the pit is backfilled with soil and compacted to prevent settling. Approximately 60 barrels of water treatment plant waste brine or reject water would be transported and injected into a licensed Class I deep disposal well in Wyoming. Garbage would be stored in containers at the well site and taken off site to an approved facility for disposal. Chemical “porta-potties” would be used during active construction.	Same as Alternative B Approximately 154 barrels of water treatment plant waste brine or reject water would be transported and injected into a licensed Class I deep disposal well in Wyoming.

Project Component	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
Gas & Water Pipelines & Electrical Lines	None constructed	<p>Approximately 0.9 miles of 15 foot wide corridor would be built.</p> <p>Buried plastic flowline would carry gas from the wells to the treatment facility. Multiple flowlines would be placed in same trench and would parallel roads to extent feasible. No gas, water and electric line are located outside of road corridors. Roughly 100 ft. of water line is located outside of the general corridors near the outfall.</p> <p>Produced water would be transported through buried plastic flowlines from each well site to the Higgins loop water treatment facility. From the treatment facility the water would be transported through buried plastic flow line to a discharge point adjacent to the Tongue River. The outfall structure would consist of a rock riprap plunge pool lined with an anti-erosion fabric. An energy dissipation device would be installed to decrease erosion potential.</p> <p>Electricity would be brought into the project area from an existing line in the southeastern portion of the POD. No new overhead powerlines would be constructed. All buried electrical cables would be installed inside of the road, gas and water corridors. These underground lines would tie into the existing aerial power lines at service taps.</p>	<p>Approximately 3.1 miles (2.2 miles for federal wells and 0.9 mile for private wells) of 15 foot wide corridor would be built.)</p> <p>Buried plastic flowline to carry gas from 16 the proposed wells and 2 existing wells to the treatment facility</p> <p>Gas, water and electricity would be managed as described in Alternative B, except that about 0.2 miles of gas, water and electric line are located outside of road corridors.</p>

Project Component	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
Road maintenance and use	Road maintenance and use would remain in the current condition.	<p>Access would be primarily by way of 0.3 mile of existing and 0.1 mile of new two track trails to access private wells, plus use of 1.25 miles of all weather county road</p> <p>Earthen materials would come from adjacent locations owned by the landowner. Scoria would be used when necessary from permitted pits for surfacing material.</p> <p>Approximately 0.5 miles of existing roads (25 feet corridor) would be upgraded to all weather conditions to access the water treatment facility</p> <p>Estimated use of access routes would be 6 vehicles per day during the 12 day drilling period.</p>	<p>Access would be primarily by way of 5.6 miles of existing and 1.4 miles of new two-track trail to access federal wells. 0.4 miles of road would access private wells, plus 1.25 miles of all weather county road</p> <p>There would be 11 low water crossings along with 2 crossings that may need culverts.</p> <p>Earthen materials would come from adjacent locations owned by the landowner. Scoria would be used when necessary from permitted pits for surfacing material.</p> <p>Approximately 0.5 miles of existing roads (25 feet corridor) would be upgraded to all weather conditions to access the water treatment facility</p> <p>Estimated use of access routes would be 6 vehicles per day, during the 12 day drilling period</p>
Discharge of Produced Water	No water would be produced or discharged	Total treated discharge to the Tongue River from the test wells would be approximately 250 gpm for up to six months ($\sim 2.0 \times 10^6$ ft ³ total)	Total treated discharge to the Tongue River from the test wells would be 450 gpm for up to six months ($\sim 3.6 \times 10^6$ ft ³ total)
Reclamation Measures	No reclamation needed	The surface would be reclaimed in accordance with the agreements with landowners. The disturbed areas would be seeded with a certified seed mix agreed to by the NRCS and the surface owner.	Same as Alternative B
Reclamation Timeframes	No reclamation needed	Reclamation would take place within 1 year where specific surface disturbing activities have been completed, and concurrent with other operations in the project area.	Same as Alternative B

Project Component	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
Air Quality Monitoring	Resource conditions would remain the same as the existing resource conditions because no action would be taken	NO _x would be the pollutant emitted in greatest quantity from alternative B. Alternative B's potential to emit NO _x (23 tons per year) would be approximately ½ of Alternative C (56 tons per year). Because Alternative B does not have the potential to emit more than 25 tons per year of any regulated air pollutant, a MAQP and/or air quality monitoring would not be required.	NO _x would be the pollutant emitted in greatest quantity from the proposed project (alternative C). Alternative C's potential to emit NO _x would be approximately 56 tons per year. While 56 tons per year exceeds the MAQP threshold of 25 tons/year, ARM 17.8.744(1)(i) exempts drill rig stationary engines with a potential to emit less than 100 tons per year and that do not operate in the same location for longer than 12 months from the need to obtain a MAQP. 54 tons of the 56-ton total is from the drill rig stationary engine and Alternative C does not have the potential to emit more than 25 tons per year of any other regulated air pollutant; therefore, Alternative C would not require a MAQP and air quality monitoring would not be required.
Wildlife Monitoring	None required	None required	Monitoring of specific wildlife species is required: -Raptor nest productivity (including bald eagle) -Bald eagle winter roosts
Soils Monitoring	None required	Sites would be monitored by onsite visits during various stages of development and reclamation to ensure accelerated erosion is not occurring.	Same as Alternative B
Water Quality Monitoring	None required	Per MPDES requirements	Same as Alternative B

Table 2.5-2. Powder River Gas – Coal Creek Plan of Development—Summary Comparison of Effects

Affected Resource & Impact Indicator	Existing Resource Condition	Alternative A – No Action	Alternative B – No Federal Action	Alternative C – Proposed Action with Additional Mitigation (preferred alternative)
<i>Air Quality:</i>				
Pollutant concentrations	The area of the proposed project is currently classified as attainment/unclassified for the National Ambient Air Quality Standards. Therefore, the area is considered to be in compliance with ambient air quality standards.	Resource conditions would remain the same as the existing resource conditions because no action would be taken.	Under Alternative B, the highest pollutant emitted would be TSP (9.48 tons). MDEQ constructed a very conservative emission inventory for the project; so, actual emissions would be well below the MAQP threshold of 25 tons per year. Because controlled emissions from Alternative B would exhibit good dispersion characteristics, would not exceed MAQP thresholds, and would be temporary in nature, MDEQ determined that controlled emissions from the source would not cause or contribute to a violation of any ambient air quality standard.	Under Alternative C, the highest pollutant emitted would be TSP (17.22 tons). MDEQ constructed a very conservative emission inventory for the project; so, actual emissions would be well below the MAQP threshold. Because controlled emissions from Alternative C would exhibit good dispersion characteristics, would not exceed MDEQ permit thresholds, and would be temporary in nature, MDEQ determined that controlled emissions from the source would not cause or contribute to a violation of any ambient air quality standard.

<i>Cultural Resources:</i>				
National Register listed or eligible sites	No sites currently listed on the National Register exist within the POD Boundary. Feature 7 (an unlined, abandoned ditch) of the National Register listed Lee Homestead extends into the southeast corner of the POD. The feature has been recommended as a contributing feature to the Homestead. Although it has not been listed, BLM has treated the feature as if it had been included in the National Register list, Lee Homestead Site (24BH2349).	No impact to cultural resources.	<p>No sites would be affected</p> <p>If any buried cultural resources were present, they could be impacted by burying the power lines and pipelines, or by road construction or construction of the water treatment facility.</p>	<p>No sites would be affected</p> <p>If any buried cultural resources were present, they could be impacted by burying the power lines and pipelines, water treatment facility construction, or by road construction. The presence of a cultural resource monitor during construction would prevent the loss of information from sites uncovered during construction.</p>

Areas of traditional cultural value	A spring between wells 5-6F and 11-6F was initially identified as a sensitive site type identified in the Crow and Northern Cheyenne Technical Reports and the Southeast Montana Ethnographic Overview. Review of the project area, including the spring, with the Northern Cheyenne THPO did not locate any TCPS in POD boundaries.	There would be no impact to cultural resources or areas of traditional cultural value.	There would be no impact to cultural resources or areas of traditional cultural value.	<p>There would be no impact to cultural resources or areas of traditional cultural value.</p> <p>A field visit was conducted with the Northern Cheyenne THPO on August 4, 2004. No Traditional Cultural Properties were noted in the project area.</p> <p>BLM does not anticipate either well impacting the spring. During the onsite visit with the Northern Cheyenne THPO, it was noted that the spring had been developed for livestock use and was not considered a TCP.</p> <p>The presence of a trained tribal monitor during surface disturbing activities would be used to reduce the potential for impacts to cultural resources encountered during construction activities.</p>
-------------------------------------	--	--	--	---

<i>Geology and Minerals:</i>				
CBNG Development	The target coal seams are the Flowers-Goodale from 1,109 feet to 1,462 feet deep and the Wall at 201 feet to 551 feet deep. Four federal and four private wells are planned for the Flowers-Goodale coal and four federal and four private wells are planned for the Wall coal. There is a private well that has been drilled in each of the two coal seams and they are located in the SWNW, Section 7, location 5-7 of the Coal Creek POD.	No gas produced from leases. No impacts to the coal formations under the leases	8 private wells would be drilled and 10 private wells tested for short period of time but not produced. During testing of these wells, small volumes of gas would be lost through venting or flaring. Information obtained during these tests would be used to determine the feasibility of commercial production.	16 wells would be drilled and 18 wells would be tested for short period of time but not produced. During testing of these wells, small volumes of gas would be lost through venting or flared. Information obtained during these tests would be used to determine the feasibility of commercial production.
<i>Hydrology:</i>				
<i>Water Quality Direct Impacts:</i>				
Max LMM SAR at Birney Day School	1.15	1.15	1.16	1.17
Max 7Q10 SAR at Birney Day School	1.76	1.76	1.77	1.78
Max LMM EC at Birney Day School (µS/cm)	731	731	731	732
Max 7Q10 EC at Birney Day School (µS/cm)	1149	1149	1150	1150
<i>Water Quality Cumulative Impacts:</i>				
Max LMM SAR at Birney Day School	1.25	1.25	1.27	1.28
Max 7Q10 SAR at Birney Day School	1.90	1.90	1.92	1.93

Max LMM EC at Birney Day School (µS/cm)	736	736	738	740
Max 7Q10 EC at Birney Day School (µS/cm)	1149	1149	1150	1150
<i>Water Quantity Direct Impacts:</i>				
Max discharge rate to Tongue River	0 gpm	0 gpm	250 gpm	450 gpm
Max LMM Flow at Birney Day School (cfs)	175.3	175.3	175.9	176.3
Max 7Q10 Flow at Birney Day School (cfs)	51.3	51.3	51.9	52.3
Radius of 20' Drawdown Contour (6 months pumping)	none	none	0.86 miles	1.11 miles
# of domestic or stock wells within the 20' drawdown area (6 weeks pumping) and potentially completed in the produced coal seams	0	0	0	0
# of springs within the 20' drawdown area (6 weeks pumping) which emit from the produced coal seams	0	0	0	0
<i>Water Quantity Cumulative Impacts:</i>				
Max discharge rate to Tongue River	0 gpm	0 gpm	624 gpm	1122 gpm
Max LMM Flow at Birney Day School (cfs)	180.4	180.4	181.8	182.9

Max 7Q10 Flow at Birney Day School (cfs)	56.4	56.4	57.8	58.9
Radius of 20' Drawdown Contour (20 years pumping)	none	none	4.0 miles	5.4 miles
# of domestic or stock wells within the 20' drawdown area (20 years pumping) and potentially completed in the produced coal seams	0	0	0	0
# of springs within the 20' drawdown area (20 years pumping) which emit from the produced coal seams	0	0	0	0
<i>Indian Trust and Native American Concerns:</i>				
Indian Trust Assets	No Indian trust lands or leases are present within the project area.	There would be no impact to Indian Trust Assets.	The limited amount of groundwater and methane produced during testing would not impact Indian Trust Assets.	Impacts would be similar to Alternative B. The amount of groundwater and methane produced during testing would not impact Indian Trust Assets.
<i>Livestock Grazing:</i>				
Livestock Operations	Three landowners/lessees in the project area running approximately 250 to 300 cow/calf pairs. Water is a limiting factor in livestock operations.	No impacts to livestock operations	Produced water may create opportunities for additional livestock water sources and livestock operations may benefit. Following reclamation after drilling, approximately 1 AUM would remain unavailable for livestock.	Same as Alternative B

<i>Social and Economic Conditions:</i>				
Coal Bed Natural Gas Production and Royalties	Natural gas production in Big Horn county in 2002 was 9,679,910 MCF, approximately 11 percent of total statewide production. Oil & Gas production taxes contributed less than one-tenth of one percent of County revenues in FY 1999. Big Horn County Federal gas production was 258,209 MCF in FY2001, with royalty payments of \$118,646.	No change from existing condition	No change from existing condition	No change from existing condition
Local Tribes	The local tribes do not provide employees, services or equipment to the PRG Project area	No change	Employees, field services, equipment would come from Sheridan, WY	Same as Alternative B
Environmental Justice	In 2000, 24% of the population living in Big Horn County and 17% of the population in Rosebud County had incomes below the poverty level. These figures compare to a state figure of 13% and reflect the relatively large numbers of persons on the reservations living in poverty.	No change	No change	No change

Soils:				
Approximate acres of Disturbance: Roads Well Pads (before/after reclamation) Corridors: Gas Flowlines Water Flowlines Electric Lines Water Treatment Facility	None	None	0.01 acres new road 4 acres/1 acre 1.6 acres 0 acres outside corridors 0.03 acres outside corridors 0 acres outside corridors 1.3 acres	2 acres new road 8 acres/2.25 acres 5.6 acres 0 acres outside corridors 0.03 acres outside corridors 0 acres outside corridors 1.3 acres
Vegetative productivity on roads	800 lbs./acre for two-track roads 1400 lbs./acre undisturbed lands	800 lbs./acre for two-track roads 1400 lbs./acre undisturbed lands	100 lbs./acre for two-track roads 0 lbs./acre on improved roads	100 lbs./acre for two-track roads 0 lbs./acre on improved roads
Vegetation:				
Montana Plant Species of Concern	No known Montana Plant species of concern in the project area.	No impacts to Montana Plant Species of Concern	Same as Alternative A	Same as Alternative A
Wildlife and Fisheries/Aquatics:				
Habitat fragmentation and disturbance in project area	Project area is currently fragmented by a county gravel road, powerline, several two-track trails and a personal residence.	No change from existing conditions	Increased habitat fragmentation with the addition of 4 well sites, 0.01 mile of access roads, and increased human presence. Total surface disturbance following reclamation would be approximately 2 acres.	Increased habitat fragmentation with the addition of 8 well sites, 2 miles of access roads, and increased human presence. Total surface disturbance following reclamation would be approximately 4 acres.
Proximity to T&E species habitat	Existing disturbance to bald eagle nesting and winter roost habitat from county road traffic and residences.	No change from existing conditions	Increased disturbance to bald eagle nesting and winter roost habitat with addition of 4 well sites, 0.01 mile of access roads and increased human presence.	Increased disturbance to bald eagle nesting and winter roost habitat with addition of 8 well sites, 2 miles of access roads and increased human presence.

Effects from changes in water quality and streamflows on aquatic species.	Existing 1600 gpm (3.56 cfs) CBNG discharge permit approved by the Montana DEQ.	No change from existing conditions	Potential impacts to aquatic species from would be minor. There is a slight potential for increased changes in water quality and streamflows due to increased discharge into the Tongue R (0.56 cfs)).	Potential impacts to aquatic species would be similar to Alternative B. Slight potential for increased changes in water quality and streamflows due to increased discharge into the Tongue R. (1 cfs (total)).
---	---	------------------------------------	--	--